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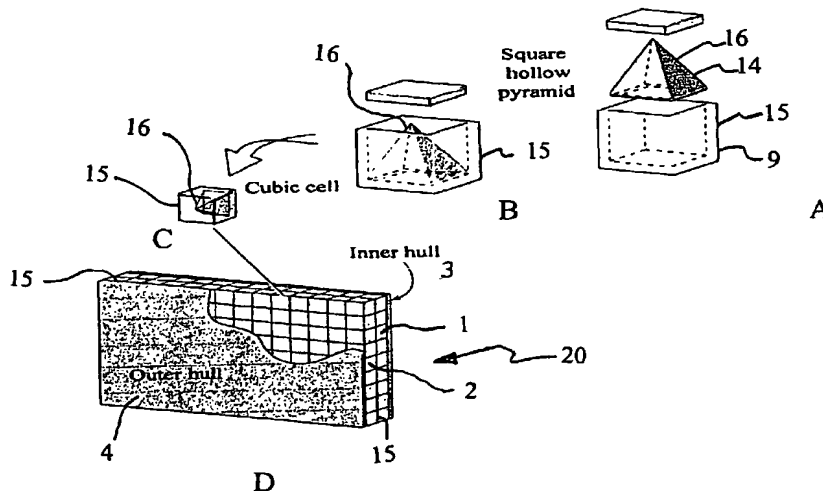
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[Continued on next page]

(54) Title: METHOD FOR MANUFACTURE OF CELLULAR MATERIALS AND STRUCTURES FOR BLAST AND IMPACT MITIGATION AND RESULTING STRUCTURE



(57) Abstract: Provided is the utilization of face panels (20) containing core materials (16) topologically structured at small scale, relative to a system (e.g. ship hull) that utilize them. They are optimized to absorb or reflect the energy subject to their while also possessing the ability to efficiently support high structural loads. It is entirely compatible with double-hull ship design concepts, because the volume between the hulls is used to locate the energy absorbing material substructures. The approach can be generalized to provide protection from impacts of low, intermediate or high intensity. The technology to design such structures requires materials selection and cell topology designs coupled with and techniques for the affordable manufacturing of structures that must be able to sustain severe dynamic deformations. It requires a coupling of effects occurring and phenomena that occur at the materials and structural levels.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/23043

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B32B 03/12
US CL : 156/60; 428/117

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 52/783.1, 784.1, 793.1, 794.1; 156/60, 182, 296, 297; 428/73, 116, 117, 118, 593

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,972,468 A (WELCH et al) 26 October 1999 (26.10.1999), column 2, lines 7-67, and Figures 2 and 3.	1-4, 15-25, 28, 29 and 32-39 5-14, 26, 27, 30 and 31
X	US 5,890,268 A (MULLEN et al) 06 April 1999 (06.04.1999), column 1, lines 52-65.	1, 2 and 34-37
X --- Y	US 5,773,121 A (METEER et al) 30 June 1998 (30.06.1998), column 3, lines 1-49; and Figure 7B.	1-4, 10-25, 28, 29 and 32-35 5-9, 26, 27, 30, 31 and 36-39
Y	US 4,968,367 A (DIDERICH et al) 06 November 1990 (06.11.1990), column 4, lines 30-62.	36-39

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☐ See patent family annex.

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 4,453,367 A (GEYER et al) 12 June 1984 (12.06.1984), column 3, lines 31-68.	1-4, 15, 16, 19-21, 24, 25, 28, 29 and 32- 35 ----- 26, 27, 30 and 31
X --- Y	US 4,194,255 A (POPPE) 25 March 1980 (25.03.1980), column 4, lines 36-51; and Figure 3.	1-9, 15, 17-19, 25, 29 and 33-35 ----- 26-28 and 30-32